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Penning-Rowell, Edmund C. ORCID logoORCID: <https://orcid.org/0000-0002-5333-8641>,
Johnson, Clare L. and Tunstall, Sylvia M. (2017) Understanding policy change in flood risk
management. Water Security, 2 . pp. 11-18. ISSN 2468-3124 [Article]
(doi:10.1016/j.wasec.2017.09.002)

Final accepted version (with author's formatting)

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Understanding policy change in flood risk management

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Abstract

Policy change in the field of flood risk management is important as it alters the direction of attention, effort and investment. We elaborate three models of policy change developed in the political science literature. These models embrace concepts such as 'policy streams', 'advocacy coalitions', and 'punctuated equilibrium' and each has been important in illuminating the process of policy change in different discipline areas in the last 20 or 30 years. Each has been refined but remains fundamentally unchanged. From this elaboration we distil an integrated model that we believe is particularly applicable to flood risk management, and have some general applicability. This model emphasises both catalytic and incremental policy change, the former related to national scale flood events and the latter to intervening relatively flood-free periods.

Key words: Floods; policy change; theory; catalytic events; incremental change.

Introduction

We need to understand the process of flood policy change in order to influence it so as to lead to better policies in the future than exist today. That understanding is best accomplished with an acknowledgement of the theories of policy change that have been developed in the past. This involves evaluating the models of policy change put forward there that simplify the underlying processes and make them more comprehensible and applicable to different fields to those in which they have been developed, for example to our field of flood risk and flood risk management. Understanding here is also enhanced if we appreciate the role that major 'catalytic' flood events can have on the policy process (Johnson et al, 2004, 2005), whilst also acknowledging the roles of the intervening processes of incremental change.

Simplifying (or modelling) the processes leading to changes in public policy has long dominated the thinking of political scientists, from early writers such as Harold Lasswell (1948) and David Easton (1953) to more contemporary thinkers such as John Kingdon and Paul Sabatier (see below). Underlying these debates is the general agreement that policy changes as a consequence of changes in human behaviour. It is, however, precisely the debates concerning the causes of this human behaviour change, which differentiates the theoretical approaches to the study of policy, and indeed why there could never be a single theory of policy change.

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A fundamental question is whether policy changes as a result of socio-economic processes or human agency? Is it a function of institutional opportunities or constraints? Is it the networks of relations between actors, the preferences and choices of the actors themselves or their beliefs, ideas and interests that are the dominant cause of changes in policy (John, 1998)? It is not the intention here to expand on the long history of debate surrounding these questions. Rather, it is important to distinguish the underlying assumptions of these debates and how they impact on the development of our understanding of the changing policies towards floods and flood risk management. In this sense, we should not regard the theoretical positions advocated to be in competition, but agree with John (1998) who states that:

'...only an integrated framework, one that utilizes important insights from all of the approaches, can fully explain the variety and complexity of the practice of policy-making and implementation. The approaches or theories are not rivals; they can complement each other, and be part of an overall explanation' (John, 1998:18).

To achieve such an integrated framework, we have drawn on insights from three theoretical positions and their originators, which include Kingdon's Multiple Streams Approach (MSA) (Kingdon, 1984, 2003), the work of Sabatier and colleagues on Advocacy Coalition Frameworks (ACF) (Sabatier, 1991, 1999; Sabatier and Jenkins-Smith, 1993) and Baumgartner and Jones's (1993) concept of the Punctuated Equilibrium. It is important to note here that although there have been many reviews, new developments and refinements of the major policy process theories presented here (e.g. Jones *et al*, 2016; Birkland, 2016; True *et al*, 2009), the fundamental characteristics of those ideas and theories have not changed to any marked degree over the last 30 years. Indeed, it is that very endurance of these ideas that helps to give them continuing relevance.

In discussing these three approaches to an analysis of the policy process we emphasise the effect of shocks on that process, given our interest in floods as episodic phenomena which have the effect of disturbing the *status quo ante*. Analysing the effect of shocks on the policy process leads us to emphasise the role of those 'catalytic' events; others have described these as "Focusing Events" (Birkland, 2016). Whilst we see the value of the latter term, because major flood events do focus the attention of many actors, we believe the term 'catalytic' is more powerful in emphasising the way shock events influence and indeed accelerate policy issues which are either already underway or dormant but potent. As such the discussion of policy process theory here cannot be comprehensive, but we consider this as an inevitable consequence of our necessary selectivity regarding "shock" dimensions.

We recognise that our thinking is focused on a particular sub-set of policy theorising which deviates from those now classical theorists who regard institutions as the dominant force of policy decision-making (Moe, 1984; Hall, 1986; March and Olsen, 1984, 1989; Ostrom, 1986, 1990, 2011; Weingast, 1989, North, 1990, Browne, 1995), those who regard socio-economic conditions as dominant (Wilensky, 1975; Hofferbert, 1974) and those who regard the individual actors as dominant (Dye, 1976; Stokey and Zeckhauser, 1978; Quade, 1976). Rather, we have argued (Johnson *et al*, 2004, 2005) and repeat the point here that institutions, socio-economic conditions and actor preferences are all important contextual factors in the policy-making process but do not determine how and why policy changes. Instead, we hypothesise that the factors driving policy change are a combination of contextual factors,

behavioural factors and the occurrence, or otherwise, of some form of catalytic event which in our case is a 'national scale' flood (which is likely to be different in different countries: see below). It is these factors which frame how problems are defined, issues are negotiated and agendas are set. Here, ideas and issues are dominant, rather than institutions or individuals.

In this paper our aim is to discuss ideas about the policy process but not to elaborate new case studies or other research on the application - or testing - of these ideas in relation to flood risk management. Instead we restrict our attention to reviewing existing policy studies literature and its contribution to theorising and policy understanding in this area. The ideas have been applied previously by us and colleagues to case study research in the UK (Johnson et al, 2005), Bangladesh (Sultana et al, 2008) and South Africa (Solik and Penning-Rowell, 2016) but we do not intend to repeat a details of that material here although a conclusion from some of that work is presented towards the end of this paper.

Multiple Streams

John Kingdon's multiple streams approach (MSA) (Kingdon, 1984, 2003), founded on an analysis of the US Federal system, is fundamentally concerned with understanding how issues materialise, how they come to the attention of policy makers, how they are framed as ideas in policy agendas and why ideas 'have their time' (Parsons, 1995:192). As an examination of the political process, Kingdon is specifically interested in the agenda setting process, recognising in particular the role of individual actors, institutions and external events on the relationship between solutions, problems, issues and ideas. Following from Lindblom (1959), Kingdon regards policy change as a continuous process of learning and adaptation rather than one of rationality and stability. At the heart of his analysis is the assumption that policies are formed, and agendas are set, as a result of three separate and distinct 'streams': problems, policies and politics (summarised and critiqued by Jones et al, 2016).

The 'problem' stream is one in which the attention of the public and policy-makers is focused on something requiring attention: in our case floods and flood risk reduction. This he believes is brought about by three mechanisms: *indicators* of the scale and change in problems; *events* which focus attention on a problem; and *feedback* from previous policies. Each of these processes provides the conditions for the emergence of a 'problem' such as flooding in need of attention.

The solutions to the problem emerge in the form of ideas in what Kingdon calls the 'policy stream'. These solutions, or ideas, float around in a policy 'primeval soup', dropping on and off the policy agenda, founded on Cohen et al's (1972) garbage can model of organisational choice. Policy communities are important because it is these communities, and certain policy entrepreneurs within them (see Becker, 2009; Meijerink and Huiteman, 2010), who invest time and resources in ensuring that certain ideas gain popularity within institutions and organisation such that they get on to, and remain on, the agendas of governments and their agencies. The accumulation of knowledge and the development of interests among actors in these communities is important here (John, 1998).

Finally, the 'political stream' determines how the emerging problems are defined. Here, therefore, public opinion, political activism, the media and Government personnel are all important for influencing the definition of the problem and the assessment of potential

solutions. We can see such processes at work in all major floods, such as in the UK in 2007 when 55,000 homes were flooded and media and government attention was substantially elevated and an enquiry ensued (Pitt, 2008).

For policy change to occur in anything other than an incremental fashion an idea needs to 'catch-on' and dominate the policy agenda. This, Kingdon argues, occurs when there is a 'policy window', brought about or responded to by the coming together of the three streams. In these conditions, a problem is recognised, and policy communities and entrepreneurs – often dominant in sub-national issues (see Robinson et al, 2010; Cairney and Zahariadis, 2016) and perhaps working in collectives (Meijerink and Huiteman, 2010) - can press for their ideas to form solutions to the problem at a time when there is political receptivity to the defined problem and the proposed solutions. Such a 'window of opportunity' does not occur often or stay open for long due to the issue attention cycle curtailing its longevity (Downs, 1972; John, 1998). Moreover not all such 'windows' result in policy change, which the 'linear', staged or 'rational' models of the policy process implicitly imply: "serendipity plays an important role in failures and successes" (Jones et al, 2016, 2).

This theoretical insight is useful for an understanding of flood policy transition in a number of ways, as supported by the analysis of river floods and related policy shifts by Meijerink and Huiteman, 2010, 11) which they suggest "fit perfectly with the Kingdom's multiple streams model". Firstly, by recognising that events focus attention on a problem it enables us to identify and hypothesise major flood events as a critical driver of FRM policy change. Secondly, by explicitly focusing on ideas it attempts to elaborate on how ideas are formed and issues are debated. This relationship between ideas, the interests that they express, and the issues that are negotiated is a key process in our perception of the definition of the flood hazard problem and the negotiation of solutions to this problem; here the issues are the solutions.

Thirdly, Kingdon notes that institutions are important in that they enable ideas to float in the 'primeval soup', although they are not generally seen in the MSA as dominant but contextual (although Albright (2011), Meijerink (2006) and Meijerink and Huitema (2010) show how the political/institutional and problem streams couple to create vital windows of opportunity). Fourthly, the idea that the political stream influences the definition of the problem, and how solutions are negotiated, is important for understanding national level flood hazard policy change, encapsulated as it is in the influence of the contemporary socio-economic conditions and political context on the problem domain. Fifthly, the role of policy entrepreneurs can be important in pushing certain issues to dominate the policy agenda, an important process in our understanding of how FRM problems are defined and negotiated not least through post-event enquiries (Waverley, 1954; Pitt, 2008; etc). Finally, and most importantly, Kingdon's notion of a 'window of opportunity' is what differentiates the process of incremental and catalytic change for flood policy transition.

Based on this, one might conclude that Kingdon's MSA would be a preferential theoretical position from which to explore policy change in the flood policy field, without any need to look elsewhere for guidance. The huge number of its applications might also support this view (Jones et al, 2016). This to us, however, is not the case because, although it is very useful for understanding how agendas are set, it says little about what influences the ideas of actors since these are deemed to emerge from 'anywhere', partly through the sharing of

agendas between actors in organisations and institutions. Such influences are critically important if we are to understand the relationship between the ideas, interests and values of actors as individuals, in institutions, and in organisations, and how they influence FRM outcomes.

Hence, although we agree that ideas concerning floods and flood risk management float around in the 'primeval soup', it is necessary to develop this further by explicitly articulating the influence of the values, beliefs and norms of actors on their attitudes to the problem and potential solutions. In this sense, the behavioural characteristics of actors are not regarded as institutionally dominant, organisationally dominant, or individually rationally dominant. Rather, it is the three-pronged influence of institutions, organisations and the socio-economic and political context, which influences the values, beliefs and norms of individual actors and how this influences their attitudes to the flood problem. These attitudes, with their external influences, then form the conditions by which interests are expressed through the generation of ideas and the negotiation of actors. These are also critically important in the types of coalitions within which policy entrepreneurs and others attempt to get their ideas on to the agendas of key organisations and of governments. It is therefore to these coalitions that we now turn.

Advocacy Coalitions

The very substantial Advocacy Coalition Framework (ACF) literature offers a viable alternative to the staged models and policy cycle frameworks by offering no beginning and end to what is seen as a continuous and quintessentially competitive policy process. Unlike the network approach advocated by Rhodes (1986, 1988), and later by Marsh and Rhodes (1992), Sabatier and colleagues have explicitly stressed over many years the importance of alliances and bargaining in coalitions rather than a mere network of actors (Sabatier, 1999; Sabatier and Weible, 2009, 2014, Weible and Sabatier, 2017). Sabatier (1993) also differs from Kingdon (1984, 2003) in that he sees the role of ideas, information and learning as a fundamental part of the political stream and a major force for change in its own right (May, 1992; Parsons, 1995).

Sabatier regards the policy process as a function of policy subsystems involving a number of advocacy coalitions each holding distinct beliefs and ideas about policy positions. Here, the flood risk management policy context would be one such subsystem. Each subsystem comprises two or more coalitions of actors, involving participants from a range of organisations and institutions, inside and outside Government, who share common and normative beliefs.

These fundamental norms and beliefs then form the core of all subsystems which in turn provides for fundamental policy positions and strategies for attaining core values (Sabatier, 1988, 1991). These core beliefs are highly resistant to change from anything other than significant perturbations; these are either external (Sabatier, 1993) or internal (Sabatier and Weible, 2009) to the subsystem. Major changes in the relevant socio-economic and political systems would be one such perturbation (e.g. Meijerink, 2006; Albright, 201), as indeed would a major national scale flood event or a major and demonstrable failure of existing policies. Both have the potential to “tip the power structure of the policy subsystem” between

competing coalitions, with internal shocks directly questioning core beliefs (Sabatier and Weible, 2009; 204).

In addition, there are secondary aspects to belief systems, which involve beliefs about the policy instruments necessary to attain fundamental policy positions. These secondary aspects are much more susceptible to change as a result of policy orientated learning and negotiation within and between advocacy coalitions (Parsons, 1995). Because secondary beliefs are narrower in scope than policy core beliefs, changing them requires less evidence and fewer agreements among subsystem actors and thus should be less difficult (Sabatier and Weible, 2009; 196). In our field a core belief might be antagonism to risk build-up; a secondary belief might be acceptance of certain development in floodplain areas which brings considerable societal benefits (e.g. playing fields or even social housing (Pardoe et al, 2011)). Through a negotiative process, each advocacy coalition adopts conflicting strategies for furthering their core beliefs, which emerge as ideas, and are negotiated in conflict with other advocacy coalitions with mediation by 'policy brokers'.

These subsystems operate in a wider institutional context involving relatively stable parameters such as cultural and social values on the one hand and more dynamic external events on the other, such as changes in the economy, public opinion and societal demographics. These stable parameters and external events then determine or constrain subsystem resources. Relatively small events, such as localised flooding, tend not to disturb stable policy arrangements, and maintain the power of existing actors or coalitions, whereas large-scale 'focussing events' - especially those close at hand (Nohrstedt and Weible, 2010) - can have important but sometimes unexpected effects on policy-making (Birkland, 2016). A disaster may generate such effects by exceeding some "tipping point", in terms of scale or public expectations, that "open (up) political space and lead to critical junctures in the social contract" (Pelling and Dill, 2010, 35). The ACF offers a dynamic view of how ideas and knowledge form the basis by which coalitions negotiate issues and agenda setting occurs (Birkland 2016). A key dimension here is that, through this process, coalitions mutate over time, often steered by processes of "collective learning" (Heikkila and Gerlak, 2013).

As a dynamic model, the ACF argues that actors in coalitions seek in plural societies to alter the behaviour of Government institutions such that their core beliefs are translated into policy objectives (Sabatier and Jenkins-Smith, 1993). This is then reflected in policy changes, which feed back into the beliefs and resources of coalitions through this process of policy and, thus further influencing their policy ideas. This is a useful way of understanding how actors negotiate issues in the agenda setting process (Birkland, 2016), not least because by articulating the importance of policy learning over time it illustrates how, during times of incremental policy change, core beliefs and values may not change.

However, at times of crisis, which in our case would be a national scale flood, it is possible for these core beliefs no longer to be sustainable because of the 'focusing' experience of learning from the disaster itself (Heikkila and Gerlak, 2013); hence the relationship we have explored between catalytic policy change and its impacts on the behavioural characteristics of actors. For Sabatier and his colleagues these external shocks can disrupt the stable pattern of interests and exchanges between coalitions and change the ideas within coalitions and the resources they can deploy, including skilful leadership (Sabatier and Weible, 2009, 203).

Such shocks can cement or fundamentally alter the coalitions themselves and hence affect the direction of policy evolution.

This is fundamental to our ideas of policy transition at times of catalytic policy change forced by a disaster such as a major flood (Johnson et al, 2005). In this sense, the ACF could be said to offer an explanation of policy change, by stressing coalitions forming, competing and possibly resulting in such change in the post-event political “window of opportunity”, although it does neglect the role of institutions and aspects of technology and infrastructure in policy-making (see Anderies and Janssen, 2013). It has also neglected to offer an explanation of the manner in which conflicts are actually negotiated between coalitions and the causal processes that lead the policy change (Nohrstedt, 2005). The differentiation between different types of networks within each coalition (Peters, 1998) also took time to emerge (Weible, 2005) in the set of ACF ideas which has, to its credit, continuously evolved and with increasing detail (see Weible and Sabatier, 2017). How groups attempt to alter the policy making process, and the speed of any change, is moreover at the centre of Baumgartner and Jones's (1993) model of ‘punctuated equilibrium’.

Punctuated Equilibrium

Baumgartner and Jones's (1993) idea of ‘punctuated equilibrium’, imported as a concept from evolutionary biology (Prindle, 2012), attempts to understand how groups of actors influence policy priorities based on the emergence and recession of policy issues in the agenda-setting process. Instead of a process of gradual Darwinian change over many years or decades, the idea postulates episodic periods of rapid policy evolution.

Unlike many of the models and approaches described so far, this model explicitly articulates both policy change and policy stability, emphasising that in terms of time the latter dominates. As with the ACF, this approach thus explicitly recognises time as an important factor. However, unlike the ACF, and Kingdon's approach, which both regard policy to be a continuous process of change, the ‘punctuated equilibrium’ model is characterised by long periods of relative stability which are occasionally ‘punctuated’ by periods of public interest, media scrutiny and action (John, 1998). Hence, by comparing issues over time, and across areas, this model attempts to explain “the forces that create both incrementalism in many circumstances and rapid changes in others” (Baumgartner and Jones, 1993: 4; True et al, 2009). Tackling as we are here an inherently episodic phenomenon such as floods, this set of ideas appears to have immediate appeal.

By focusing on shifts in the rate of policy change, Baumgartner and Jones explore how certain ideas become institutionalised in the decision-making process. In so doing, they argue that key decision-makers in institutions seek to ensure that certain issues dominate the agenda setting process by enlisting the support of elite beliefs in the political process, ensuring favourable media coverage and public opinion. The outcome of this is generally incremental policy change or stasis. Whilst this is the norm, they argue that because institutions and organisations tend to focus on only one issue at a time, there are certain conditions whereby these established ideas and agendas can be significantly altered, or to use their phrase ‘punctuated’, by sudden ‘lurches’ or accelerations, starting with the agenda setting dimensions of the policy process (True et al, 2009). The punctuated equilibrium theory is an implicit theory of individual and collective decision-making, and large-scale

policy punctuations spring from either a change in preferences or a change in attentiveness within individual or collective decision making (True et al, 2009, 163). The result can be periods of crisis exploitation by actors within the policy subsystem to significantly alter levels of political support for public policies (Boin et al, 2009).

The basis of this model is that policy subsystems are continually being created and destroyed with negative feedback resulting in incremental policy change and positive feedback resulting in major disruptions to policy; their primary thesis is that political systems are never in general equilibrium. Bubeck et al (2015) have suggested that FRM is similarly always in a constant state of flux. Stability is maintained by the existing institutional structures and by the manner in which issues are processed by these institutions. Within this context, incremental change occurs when negative feedback dominates.

By contrast, any change in issue definition can lead to destabilisation and rapid change away from this point of stability, perhaps as new participants are brought into the agenda setting process. Thus, new or dormant ideas gain momentum quickly and diffuse throughout the political system until they have replaced old ones. In this way, ideas migrate across policy arenas resulting in new points of stability. Here, the involvement of people 'outside' the extant policy system is important, with the widening of agenda access resulting in new issue definition. For these authors, "issue definition and institutional control combine to make possible the alternation between stability and rapid change that characterizes political systems" (Baumgartner and Jones, 1993: 16).

For Baumgartner and Jones, the same forces that create stability also create instability. The difference is the extent to which new participants are attracted to an issue and the manner in which these new actors are mobilised by policy entrepreneurs within policy monopolies. Thus, change occurs when a new issue is negotiated resulting in the inclusion of new decision-makers, organisations, the media and the public. Old policies are seen to have failed. The negotiation of the issue, particularly within the media, then feeds the agenda setting process resulting in periods of rapid change. This change is not inevitable or necessarily far-reaching or comprehensive, so the model is perhaps more descriptive than predictive: some crises result in no change or simply a continuation of incremental change (Boin et al, 2009)

This is a useful model for our problem domain of flood risk management for a number of reasons. Firstly, it explicitly recognises that whilst institutions are important they are not dominant. Instead, it acknowledges that at times they operate to constrain access to policy decision-making, define the issues that are negotiated and set the agenda. However, it also recognises that when new ideas emerge this may fundamentally alter the issues negotiated, how the agenda is set, and ultimately the nature of institutions themselves. Under conditions of incremental change, institutions are not expected to fundamentally alter or change. By contrast, under conditions of catalytic change or the punctuation of a pre-existing equilibrium, there is a significant increase in the capacity for changes in the institutional structure itself.

Secondly, this theoretical approach recognises that the interests of individuals and groups of individuals in networks and coalitions are important in defining issues and setting agendas which, when 'punctuated' by new ideas, new interest groups can then alter the agenda setting process. In our problem domain, any national scale flood event increases media attention,

allows new issues to emerge, which, in turn, generally increases the range of actors involved. By increasing the range of actors involved this further increases the number of issues negotiated which helps to redefine the problem domain and set the new agendas: positive feedback takes over.

Thirdly, the significance of policy entrepreneurs is important in term of problem definition and negotiation. Here, therefore, the idea that such entrepreneurs can mobilise the apathetic in problem definition is clearly important. Fourthly, the central notion of ideas in the Baumgartner and Jones's model is clearly translated into this perspective in that ideas are hypothesised to be critically important in the defining and negotiation of issues in the agenda setting process: new ideas have transformed FRM policies (e.g. Lane, 2013) . Finally, and most importantly, the model of 'punctuated equilibrium' is the only model which focuses explicitly on policy stability and policy change, recognising the importance of the rate of change and that the policy process can often remain stalled. This 'two speed' character is a critical component in the analysis of flood policy transition (see again Lane (2013).

A model of incremental and catalytic policy change

An understanding of policy change and policy stability, in the context of flood hazard management, requires the explicit recognition of the importance of time. In this sense, we agree with Sabatier when he argues that any understanding of policy-making requires a time perspective of at least a decade or more (Sabatier, 1987:651). It is important, therefore, that the theoretical model of incremental and catalytic policy change that we have developed (Figure 1) is evaluated with this assumption in mind.

Several influential public policy scholars (e.g. Cairney, 2013; Birkland, 2015) have developed ideas or models that combine elements of the theories of the policy process described above, responding to John's (1998) exhortation quoted above. At its heart, the model we developed in 2004/5 (Johnson et al, 2005) and later refined (Solik and Penning-Rowsell, 2016) takes elements from all three of the policy process theories discussed above which, to repeat, today remain more or less unchanged from as first described. We do not claim our model is superior to those of others; we simply have found it useful in the UK FRM context. It argues that the policy process is one of relative stability, 'punctuated' by times of rapid change (Baumgartner and Jones, 1993). This punctuation is primarily brought about by flood events which if national in nature and scale, offer a 'window of opportunity' to increase the rate at which policy changes, the range of actors involved and the number of issues negotiated (Kingdon, 1984, 2003) (Table 1, question 1). Thus, the model assumes incremental changes in policy when there is a local, or no, flood event and catalytic changes in policy when there is a national scale flood event (Lindblom 1959, Baumgartner and Jones, 1993). Such an event is not easy to specify but is one which can be large in geographical extent, or particularly intense, or very threatening, or especially enduring. In the UK this corresponds to the recent floods in 2000 (widespread), 2007 (Hull, etc), 2004 (Boscastle) and 2014 (Somerset) respectively. We do not mean such events are nationwide, any more than were the undoubtedly national scale US events of Katrina or Sandy.

Incremental policy change is illustrated as a continuous process of learning and adaptation, such that behavioural and contextual factors influence the manner in which the flood hazard problem is defined but they do not determine change *per se*. Rather, the model assumes that

institutions and organisations are important contextual factors within which ideas float in the policy 'primeval soup' but they do not condition policy change (Kingdon, 1984). Likewise, whilst changes in information, technology and knowledge are clearly important in the development of the problem definition, and the negotiation of solutions to these problems, they are not anticipated to be driving forces for change or stability. Similarly, socio-economic and political conditions are assumed to be important contextual factors for understanding how policy makers, policy implementers and the public perceive and respond to floods but they are not regarded as causal variables in the agenda setting process. Rather, the negotiation of this problem definition is modelled as a function of the interplay of advocacy coalitions (Sabatier, 1987, Sabatier and Jenkins-Smith, 1993), with their key policy entrepreneurs. It is this which then influences the setting of public policy.

Within the model, the role of Advocacy Coalitions is regarded as important for the negotiation of problems and issues during time of both incremental and catalytic change. At times of incremental change, these coalitions are influenced by changing contextual factors and the values, beliefs and norms of the actors involved in the policy subsystem. This process is expected to continue during times of catalytic change, the difference is that the national scale flood event provides an opportunity for increasing the rate of policy change, the range of actors involved and the number of issues negotiated. This is assumed to occur because national scale flooding offers an opportunity for including those whom were previously apathetic to, or disengaged from, the policy domain (Marsh and Rhodes, 1992; Baumgartner and Jones, 1993). These 'new' actors (e.g. Pitt, 2008; Monbiot, 2016) bring new ideas about the problem definition and new ideas about the issues or solutions required in the agenda setting process (Table 1, question 2).

As each Advocacy Coalition is deemed to have core normative beliefs, which fundamentally determine policy beliefs and instruments for addressing the problem, these 'new' actors are expected to align with those coalitions sharing similar belief systems, or where no such coalition exists a new coalition will be formed.

These 'new' actors may emerge from a range of institutions, organisations and the public at all levels of decision making. Thus, what makes the concept of Advocacy Coalitions so interesting is that ideas, beliefs and values are not deemed to be constrained by institutions and organisations. In this sense, the media, researchers, public interest groups, flood victims, local MPs and many others share core values and beliefs, which influence public discourse and media representation in the definition of their flood hazard problem (Harries and Penning-Roswell, 20XX) (Table 1, question 3). As these 'new' actors are expected to be harnessed by policy entrepreneurs within competing Advocacy Coalitions, the ideas and interests of these actors are expected to be negotiated within, and between, these coalitions in the setting of agendas (Table 1, question 4).

These first four questions in Table 1 focus on the differential relationship between catalytic and incremental policy change in the problem domain. This, we argue, is what differentiates the significance of national floods from other contributing factors on flood hazard policy formation. Thus, during periods of both incremental and catalytic policy changes, contextual and behavioural factors are equally important. There are, however, more fundamental opportunities offered by national scale floods which may not only impact on the problem

domain, within which Advocacy Coalitions operate, but may also impact on the core beliefs, values and norms of actors and the context within which they operate.

Where coalitions are successful in securing their policy positions on the Government agenda, the rate of policy change will be accelerated but these core beliefs will not be altered. However, where these coalitions are not successful, it is possible that the national scale flood may destabilise Advocacy Coalitions in such a way that their core beliefs may prove unsustainable (Sabatier and Jenkins-Smith, 1993). Hence, we have inserted the link in the model between catalytic policy change and changes in the behavioural characteristics of actors. This leads to the fifth question in Table 1 concerning changing belief structures.

In a similar vein, by accelerating the process of change and increasing the range of actors and interests negotiated, the national flood provides an opportunity to alter the contextual factors within which decisions are made. This differs significantly from incremental change which, whilst influencing the problem domain, is not expected to provide the opportunity for significant changes in institutional structures, socio-economic conditions or political contexts. Hence the final three questions in Table 1 concerning contextual factors.

These eight questions illustrate the need to explore what are the fundamental differences depicted in the model between catalytic and incremental policy change (the latter badly under-researched). There are, however, underlying assumptions in the model based on the theoretical positions referred to earlier. These are applicable to the policy process irrespective of the rate at which policy change occurs and can be summarised as in Table 2.

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Table 1: Research questions posed by the model of incremental and catalytic policy change

1. To what extent does a 'national' flood event create a 'window of opportunity' for increasing the rate at which policy changes or for shifts in policy direction: catalytic policy change as opposed to incremental change?
2. Does a 'national' flood event create this 'window' for policy change by involving actors who were previously disengaged?
3. How far does a 'national' flood event creates a 'window of opportunity' by increasing the discussion of issues in the media, in public discourse and between competing Advocacy Coalitions.
4. By increasing the number and range of ideas and issues negotiated, how far does the national flood event create the opportunity for redefining the flood hazard problem by bringing new ideas to the top of the policy agenda? This may or may not lead to changes in pre-existing patterns of interests and coalitions of ideas.
5. Does catalytic policy change offer a window of opportunity for changing core values, beliefs and social norms?
6. Does catalytic policy change provides a 'window of opportunity' for the development and application of information, knowledge and technologies?
7. Does catalytic policy change provides a 'window of opportunity' for changes in institutional structures and organisations?
8. Does catalytic change lead to changes in public opinion, political structures and processes and to changes in legitimacy?

Table 2: Assumptions inherent in the model of incremental and catalytic policy change

1. The behavioural characteristics of actors do not determine how agendas are set and policy is changed. Rather, beliefs, values and norms are important for influencing the attitudes, interests and ideas of actors, in coalitions, in defining the policy problems and negotiating possible solutions to these problems.
2. The behavioural characteristics of actors are influenced by, and in turn influence, the changing contextual factors within which the flood occurs.
3. Changes in information, technology and knowledge directly influence, although do not determine, the problem and policy domain.
4. Changing institutional and organisational arrangements are important factors for providing opportunities and constraints on actor negotiations but the rules and norms of institutions in particular are not deemed to determine problem definition, negotiation and agenda setting.
5. Socio-economic and political contexts are important exogenous variables offering constraints and opportunities in the problem domain but they don't determine this domain.
6. Problems are defined by a process of negotiation between Advocacy Coalitions, with the involvement of policy entrepreneurs, which sets agendas and ensures that certain ideas dominate the policy making process.
7. The range of actors in coalitions includes actors in the state apparatus, local level agencies, community groups, issue groups, the media, academics and researchers with an interest in the policy domain and the general public.
8. The 'type' of policy change is determined by the negotiation of the policy problem rather than as a direct result of the rate of change. Hence, both catalytic and incremental policy changes can result in policy innovation, succession, maintenance or termination.

Figure 1: Theoretical model of incremental and catalytic policy change

(Johnson *et al.*, 2003)

